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change of temperature is allowed for. The most important result in the former case is the relation between pressure and velocity, which is shown to be that which is expressed by the equation

$$p = p_0 \epsilon \frac{v}{\sqrt{\mu}};$$

from which several new results are obtained.

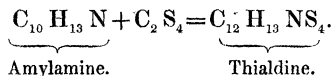
With respect to the velocity of sound, which has hitherto been found experimentally to exceed the velocity obtained by theory, it is shown that the value obtained by approximative methods is the *minimum limit* of sound-velocity, so that the actual velocity will always be greater; the excess depending upon the intensity and genesis of the sound. It is shown that all the parts of a wave do not travel at the same rate,—a circumstance which leads to the formation of a bore in the front of the wave. Several previously unexplained phenomena, which have been recorded by different experimentalists, such as double reports of fire-arms heard at a great distance, the outrunning of one sound by another observed by Capt. Parry, the comparative powers of different gases of transmitting sounds, and the laws of transmission of sound from one medium to another, are accounted for in this paper, and directly deduced from the integral of the equation of wave-motion.

IV. "Contributions towards the History of the Monamines."

By A. W. HOFMANN, LL.D., F.R.S. Received November 25, 1858.

2. *Action of Bisulphide of Carbon upon Amylamine.*

In a note on the alleged transformation of thialdine into leucine, addressed to the Royal Society about eighteen months ago*, I alluded to a crystalline substance observed by Wagner when submitting amylamine to the action of bisulphide of carbon. This substance was not analysed, but considering its mode of formation, Wagner suggested that it might possibly be thialdine.



* Proceedings, vol. viii., Op. 4.

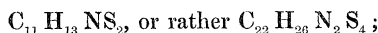
A superficial comparison of the properties of thialdine with those of the substance produced by the action of bisulphide of carbon upon amylamine, enabled me at once to recognize the difference of the two bodies; and satisfied with the result, I did not at the time examine more minutely into the nature of the latter substance.

The new interest conferred upon leucine by recent researches which characterize this substance as capronamic acid, has called my attention back to the sulphuretted derivative of amylamine.

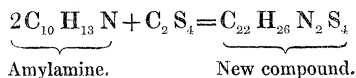
This body may be readily procured by mixing anhydrous amylamine with a solution of dry bisulphide of carbon in anhydrous ether. The mixture becomes hot, and deposits, on cooling, white shiny scales which are scarcely soluble in ether, and may therefore be purified by washing with this liquid.

The new body is likewise insoluble in water, but readily dissolves in alcohol; when dry, it may be exposed for a time to a temperature of 100°C . without undergoing fusion; after some time, however, the substance begins to be liquefied and to undergo complete decomposition. The same change occurs, although more slowly, at the common temperature, when sulphuretted hydrogen is evolved; a mixture of free sulphur with a new crystalline substance, extremely fusible, insoluble in water, but soluble both in alcohol and ether, remaining behind.

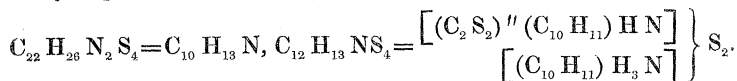
Analysis has proved that the compound produced by the action of bisulphide of carbon upon amylamine contains



and that it is formed by the union of 2 equivalents of amylamine with bisulphide of carbon.



A glance at this formula suffices to characterize this compound as amylsulphocarbamate of amylamine.

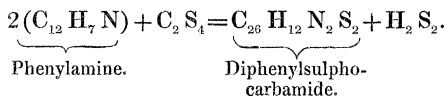


This view is easily confirmed by experiment. Addition of hydrochloric acid to the crystalline compound immediately separates an oily liquid, which gradually solidifies, and the acid solution now con-

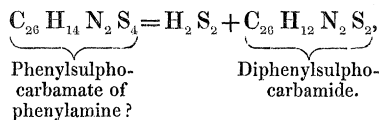
tains amylamine which may be liberated by potassa. The oily substance is obviously amylsulphocarbamic acid: it dissolves in ammonia and in potassa; mixed with amylamine, it reproduces the original crystalline compound.

Experiments with ethylamine have furnished perfectly analogous results. I have been satisfied to establish qualitatively the analogy of the reactions.

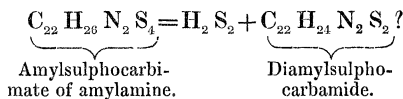
It is of some interest to compare the deportment of amylamine under the influence of bisulphide of carbon with that of phenylamine in the same conditions. If both bodies gave rise to similar changes, we should expect in the case of phenylamine the formation of phenylsulphocarbamate of phenylamine. But experiment has proved that phenylamine immediately produces diphenylsulphocarbamide (sulphocarbamilide), sulphuretted hydrogen being evolved—



Nevertheless it is extremely probable that further experiments will establish a perfect analogy in the deportment of bisulphide of carbon with amylamine and phenylamine. Diphenylsulphocarbamide is probably the product of decomposition of a very unstable phenylsulphocarbamate of phenylamine—



while a more minute examination of the crystalline substance obtained by the action of heat upon amylsulphocarbamate of amylamine cannot fail to characterize it as diamylsulphocarbamide—



The apparent dissimilarity of the two reactions would thus be reduced to the unequal stability of the sulphocarbamic acids of the amyl- and phenyl-series.